

May 20, 1988

CD-88-07 (LD)

Dear Manufacturer:

SUBJECT: Side Fan Cooling for Emissions Testing

This letter provides guidance on the use of side fan additional cooling for Federal Test Procedure (FTP) testing. Beginning with the certification of 1990 model year vehicles, side fan cooling will no longer be automatically allowed for FTP testing without the manufacturer making the necessary showing required by the regulations. Additional cooling in general is allowed under 40 CFR 86.135(b) if "the manufacturer can show that during field operation the vehicle receives additional cooling and that such cooling is needed to provide a representative test,..."

Since 1980, we have allowed use of side fans during dynamometer testing without any demonstration of need or evaluation of potential emission effects. Manufacturers first requested the use of side fans as a safety precaution, primarily to prevent overheating rear tires and brakes on the dynamometer rolls. We allowed the side fan cooling on this basis without prior justification because of the potential rear-wheel-drive vehicle mechanical cooling problem. At the time, we did not believe there was a potential effect on emissions or fuel economy, and hence, we did not require manufacturers to make a showing under 40 CFR 86.135 that such cooling was needed to provide a representative test. More recently it has come to our attention that side fan cooling may have an impact on evaporative emissions and hence should only be permitted if a determination can be made that such cooling is necessary to provide a representative test.

The potential impact of the side fan on emission test results arises when considering the effect of fuel tank cooling on the evaporative emission control system. A typical evaporative emission control system includes an evaporative emissions storage canister which receives fuel vapor from the carburetor bowl (on carbureted vehicles) and the fuel tank. Most fuel tanks are positioned to the rear of a vehicle's underbody. Side fans are oriented to provide additional air flow to this area. This air flow cools the tank fuel, which reduces the amount of fuel vapors expelled from the fuel tank to the

canister during a test. Less fuel vapors to the canister reduce the possibility of canister "breakthrough" (vapors exceed the canister's storage capacity). Overall evaporative emissions could be reduced resulting in a test that may understate emissions compared to commonly encountered field conditions.

Although only preliminary data exists to support this potential impact, it is reasonable to expect significant reductions in evaporative emissions test results with the use of a side fan. Further, side fan cooling for many vehicles may not be representative of the cooling actually received in-use in normally encountered urban driving temperature conditions. Consequently, we can no longer continue to automatically allow side fan cooling unless there is a demonstrated need on a case-by-case basis.

In evaluating a request for side fan use EPA will consider information submitted by the manufacturer demonstrating that such additional cooling is needed for a representative test. Requests should include information showing that the normal cooling configuration insufficiently cools the fuel tank so as to create excess emissions that would not occur in normally encountered urban driving temperature conditions. Data on fuel tank cooling gathered under reasonably encountered high ambient temperature conditions* is most appropriate. More specifically, EPA finds helpful the following information to adequately evaluate a request:

1. Description of Test Conditions
(e.g., ambient temperature, driving cycle, engine/evaporative family, vehicle body configuration)
2. Description of Parameters Measured
3. Description of How Additional Cooling Was Achieved
4. Results of Parameter Measurements
 - a. During Field Operations
 - b. On Dynamometer with Additional Cooling
 - c. On Dynamometer without Additional Cooling
5. Explanation of How the Measured Differences Affect Emissions
(If side fan cooling had no impact on emission test results

compared to results obtained without side fan cooling, no side fan would be necessary.)

6. Emissions Test Results

- a. On Dynamometer with Additional Cooling
- b. On Dynamometer without Additional Cooling

* Based on urban temperature profiles corresponding to ozone exceedance days, temperatures greater than or equal to 95 F are reasonably encountered high ambient temperatures.

Only sufficient cooling to achieve a representative emissions test will be considered for approval. If there is a safety concern that requires additional cooling to some component (e.g., brakes), EPA will not approve a cooling configuration that unrepresentatively overcools the fuel tank. (This would defeat EPA'S intention to provide a representative test for evaporative and exhaust emissions.) If a side fan is requested to address a safety concern, information regarding the occurrence and methods of preventing any unrepresentative impacts of this cooling would be helpful in evaluating such a request.

Similarly, if the manufacturer shows that the fuel tank is not adequately cooled with only the standard front fan configuration, manufacturers should provide information showing that the additional side fan cooling does not cause unrepresentative additional cooling to the fuel tank. If it is determined that unrepresentative cooling would result, the manufacturer should propose a method which would allow only the cooling needed by the fuel tank.

Manufacturers should allow EPA sufficient lead time to evaluate side fan additional cooling requests. Manufacturers should not use additional cooling of any type that has not been approved by EPA during official testing at their facility.

At this time EPA cannot provide specific analysis techniques or acceptance criteria for justifying the need for side fan cooling. Further discussions and experience with manufacturers will be needed. EPA invites comments on how to best evaluate the cooling needs of vehicles being operated on the FTP. Commentors should keep in mind that test representativity in relation to normally encountered in-use driving must be maintained and that normally encountered in-use driving is not

limited just to FTP-type conditions. EPA prefers to standardize dynamometer cooling configurations as much as possible. (Highly specialized cooling setups will not likely be acceptable for use at MVEL for certification testing.) If sufficient interest is expressed, EPA will consider holding a workshop to discuss the development of standard on-road to dynamometer comparison techniques.

Sincerely,

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